

A CASE STUDY FOR THE SYSTEMS APPROACH FOR DEVELOPING CURRICULA

“DON’T THROW OUT THE BABY WITH THE BATH WATER”

Dr. Anthony A. Scafati

Instructional systems design (ISD) is a systematic model used to plan, design, develop, and evaluate training. The Defense Acquisition University consortium uses ISD to develop and revise curriculum. If we agree that all learning manifests itself by observable behaviors, then we can measure the progress and effectiveness of training. The author urges that ISD is especially effective in developing learning experiences that meet the needs of acquisition community. It does not hamper “academic freedom,” but instead provides consistency and performance standards—both necessary for the move to distance learning and computer-based instruction.

Ruth Colvin Clark (1989, p. 3) defines instructional systems design (ISD) as a “...systematic model used to plan, design, develop, and evaluate training.” There are many ISD models in existence today, but all have a variation of the following characteristics. They incorporate:

- a needs analysis;
- a task analysis;
- a definition of learning objectives;
- the development of an assessment plan;
- the development of learning material;

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- a plan to try out with revision (pilot); and
- the implementation of the final product (Clark, 1989).

The systems approach models are the result of more than 25 years of research in the learning process (Dick & Carey, 1990). It is used throughout industry and government and in academia. It is not the only way to develop curriculum, but it is a proven and effective model. The Defense Acquisition University (DAU) and, consequently, the DAU consortium schools, use their version of ISD to develop and revise their curriculum. The latest guidance concerning the DAU methodology is found in the "Defense Acquisition Guide for Curriculum Development, Delivery, and Evaluation" (November, 1997), which can be found on the DAU Home Page (<http://www.acq.osd.mil/dau>).

The systems approach to designing curriculum has many names: Instructional Systems Design (MilStd 1379D)—the old military standard, The Critical Events Model (Nadler, 1982), Systematic Design of Instruction (Dick & Carey, 1990), the DAU Guide for Curriculum Development, Delivery, and Evaluations (November, 1997), and a host of others. They all are based on a common belief that all learning

manifests itself by observable behaviors in the psychomotor, cognitive, or affective domains. And if there is any credence to the metaphor that learning is a journey, then with ISD we can describe the end state and measure our progress and effectiveness in getting there. If we don't take the time to determine precisely where we are going, we will not be able to determine the effectiveness of our process. And as the saying goes, "Any road will do if you don't know where you are going."

The ISD model is especially effective in developing learning experiences that meet the needs of a well-defined target audience and other stakeholders (such as our Functional Boards). It can do so while maintaining currency and consistency in a rapidly changing environment, such as acquisition reform.

For the past year, the Defense Systems Management College (DSMC), as well as the other DAU Consortium Schools, has performed in a yeoman fashion the reengineering of all of its major courses.

The process the schools employed was the DAU ISD model. During this process, the schools experienced a considerable amount of oversight from the Functional Boards and DAU. For many in the consortium schools, this has been a traumatic experience. ISD in the best of

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circumstances is a labor-intensive process requiring between 60 to 100 hours of development time for every hour in the classroom. This development overhead rapidly increases as we move to the technology-based education (TBE) delivery media.

For the novice, the gains in quality learning by using this process are not immediately apparent. It is especially difficult to see the worth of this effort when the immediate results of the first offering are not showing the gains in student satisfaction that was and should be expected. Never fear; ISD is an iterative process and is expected to be less than perfect on the first offering. The truth be known, it is never finished. The final step in the ISD process is to evaluate the process (note that I did not say “the student”) and change the process when indicated. If you make a conscious decision to forego the “try out with revision” step (also known as a pilot), then you can expect even greater discrepancies.

ISD, as an engineering process, appears to have little flexibility. Some may view the process as a loss of academic freedom. Academic freedom, as defined by Brubacher & Rudy (1976, p. 308) is... “the right of a professor to follow an argument whither so ever it may lead either in his research or in his teaching....” Another definition, espoused by *Webster’s II* (1984, p. 69), is “...without interference, as from school or public officials.” These definitions are the quintessential essence of higher education, where ideas are allowed to be discussed and aired without fear of retribution by higher authority. Academic freedom at its core assures First Amendment rights and fosters research, creativity, and learning by allowing the full range of the exploration of

ideas. Neither *Webster’s* nor Brubacher & Rudy’s definition of academic freedom, however, exempts a professor from meeting the specific and implicit objectives of the course or lesson, as articulated in the performance outcomes and the terminal learning objectives (TLOs). It is an institution’s prerogative to determine objectives. One implicitly agrees to follow this direction when hired.

One of the primary strengths of the systems approach to developing curriculum

is defining clear and measurable objectives. By clearly defining the objectives and the assessment processes of a course or lesson, ISD provides a consistent and repeat-

able educational experience. Consistency is the sense that any number of students can be exposed to the process and be assured that they will attain mastery of the subject. Constructed properly, this consistency is assured by designing fidelity into the lesson or course from a test question up to and including the performance outcome. In simpler terms, it means that each question on a test, and each assessment opportunity, is designed to address the behaviors expressed in the performance outcome with a high level of correlation. This characteristic is extremely important to an institution that needs to educate large numbers of students to meet an acceptable performance standard. The consortium schools are such institutions.

Another concern of the faculty is the expenditure of time needed to design

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courses using the systematic approach models. Earlier I stated that, for planning purposes, an expenditure of 60 to 100 hours of development time is required for each hour in the classroom. In my experience these hours increase dramatically when we are developing or converting courses to TBE. Time is a scarce and critical commodity, especially as the demand for professor time is on the rise while personnel resources are being reduced.

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"What I am concerned about is the possibility that the pressures related to teaching preparation, teaching, and curriculum development are so great that the true value of what the schools have accomplished will not be understood by the faculty."

plished will not be understood by the faculty. In this environment there is a possibility that the ISD process will be regarded as noxious and with little return on investment. The result may be the paying of lip service to the process or worse yet, re-

turning to the former "intuitive" curriculum design method—so long practiced here and in higher education in general. (By "intuitive" I mean each individual professor selecting what is important to learn, resulting in the lack of consistency among and between professors of the same subject and over time.) If this occurred, it would be a disservice to the schools and to all their customers.

Intuitive curriculum development has found a legitimate place in traditional higher education. Higher education, (except for some technical curricula, such as nursing), is not responsible for educating students for a specific workplace with specific expected behaviors. Therefore, considering the vast amount of knowledge accumulated in any traditional field, such as liberal arts or science, the selection of the outcomes is usually prescribed by the individual professor. Those professors cannot measure their educational effectiveness against a set of competencies or performance measures, because those competencies and performance measures do not exist. Who, for example, knows where student "X" is going to work when he or she graduates with a B.S. degree from Anyplace University? The graduates themselves do not know until the final hour, if then. Traditional higher education measures student against student. The students compete for a grade and are not encouraged to engage in cooperative learning. In acquisition management team problem solving, integrated product teams (for example) are not only allowed, they are mandated. The schools teaching acquisition management must simulate the work environment; therefore learning, like work, is cooperative. Students should not be measured against each other but assessed against a performance standard.

We in the Consortium Schools know the specific workplace where our graduates are going and how they will be required to perform. Therefore, our course objectives—performance standards if you will—cease to be the prerogative of the individual professor but become the natural outcome of a systematic analysis of the student and institutional needs.

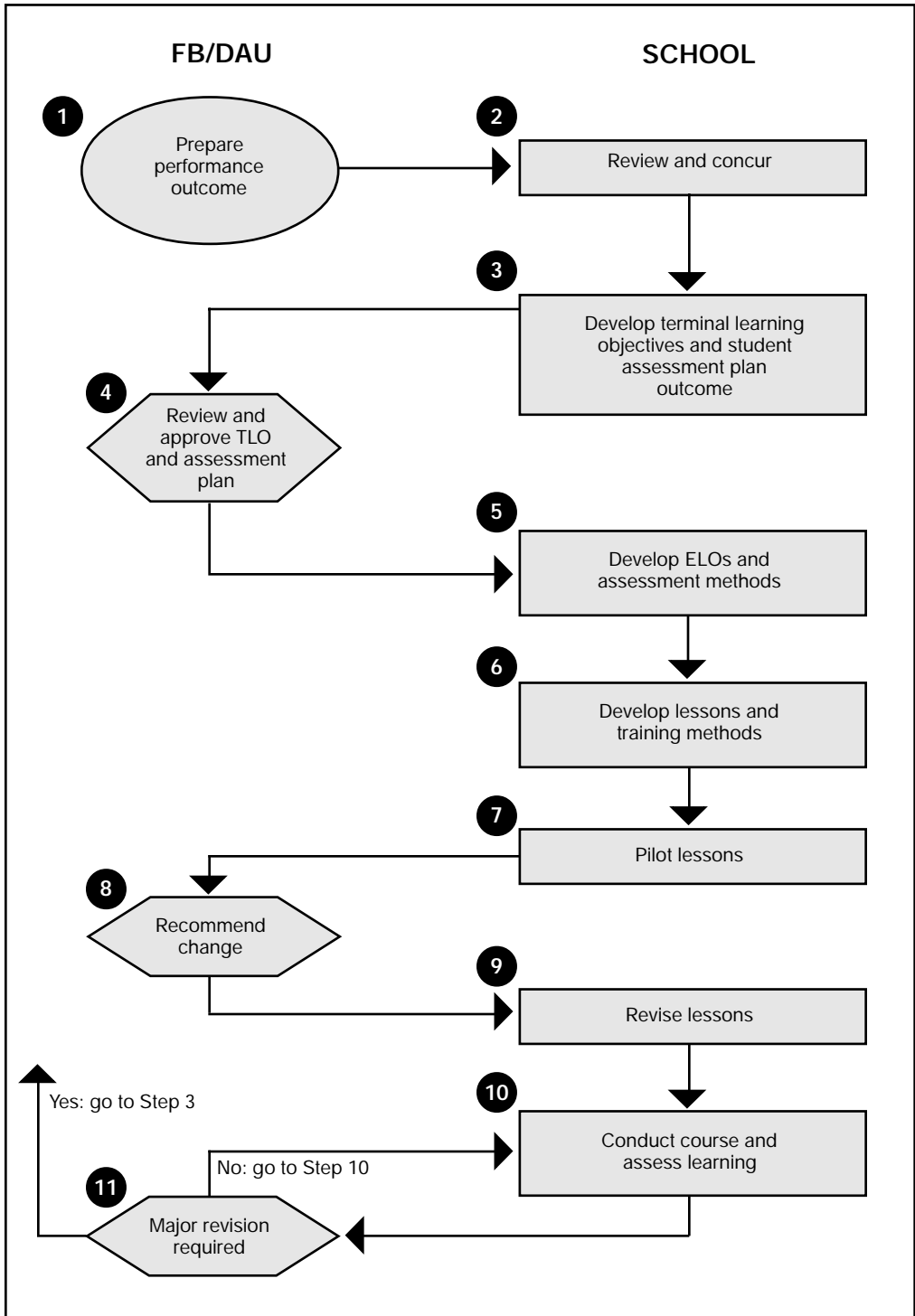


Figure 1. The Systems Approach to Developing Curriculum

Please understand that the ISD process only requires that the student reaches minimum behaviors to perform adequately in the field through the educational process. This does not prohibit the professor from facilitating learning to the extent a student's prior experiences and time allows. Additionally, the ISD process will provide one way of teaching a course via the Instructor Guide (IG). The IG should never be the *only* way to teach. Therefore an individual professor maintains the right to select the media and to go beyond the minimum objectives.

The school's responsibility is to take the institutional needs as defined by the Functional Boards (Performance Outcomes), and design a course that contains terminal learning objectives (TLOs) and a selection of enabling learning objectives (ELOs), a student and course assessment

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plan, and a delivery system, which meets the level of learning desired within the constraints of time and resources. The delivery and assessment areas are most appropriate for individual professors to exercise

academic freedom and creativity in making the learning experience an adult and creative experience for the student. Each offering of a class need not be a carbon

copy of the others. The professors' individual creative strengths and specific needs of their students drive the methodology. The only caveat expressed is that when a professor deviates from a course design, his or her students must fare as well as others, as measured by standard assessment tools.

I believe that if we continue to follow a systems approach design philosophy and exploit the inexhaustible talent of the Consortium Schools faculty, we can meet the spirit and the letter of the DAU guidance and encourage creativity while bringing a dynamic and challenging learning climate to our students Figure 1 is a notional flow of a typical systems approach to designing curricula.

Let us remember that what we have done in this last year, as far as curriculum design is concerned, is to utilize with some degree of efficiency what has long been proven by educators and trainers alike to be an effective methodology to design and improve curriculum. It is not the only way—but it is a proven way. Let us not be discouraged by a lack of empirical data to prove our success. That will come from the assessment data gathered from students, faculty, alumni, and their supervisors. Let us not fail to realize its benefits to us and, more important, to those whom we are most responsible: the students. Teachers are ultimately responsible for facilitating the learning environment. We have an approved and a provable design methodology. Let's *not* throw the baby out with the bath water!

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